General

Guideline Title

Motor vehicle collision-related injuries in the elderly: an Eastern Association for the Surgery of Trauma evidence-based review of risk factors and prevention.

Bibliographic Source(s)

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology suggests the phrases, "strongly recommend" for strong evidence and "suggest" or "conditionally recommend" for weaker evidence.

Population, Intervention, Comparator, and Outcome (PICO) Question 1

Are car engineering advancements effective at preventing motor vehicle collision (MVC)-related injuries among the elderly?

Recommendation

The guideline committee suggests that ongoing engineering advancements in car safety restraint systems begin to take into account passenger-specific factors such as age, weight, and height.

As the United States (US) population proportionally ages, the number of elderly drivers can be expected to increase. The literature has demonstrated that elderly drivers are at significant risk of injury when involved in an MVC as a driver, passenger, or pedestrian. The current safety restraint standards for vehicles in the US do not take into account the vulnerability to injury of elderly vehicle occupants. In low-speed collisions, the very restraint systems designed to prevent injury may be contributing to chest/torso injuries in the elderly. An ideal solution would entail the development and implementation of sex-, height-, and weight-sensitive restraints to protect elderly occupants.

PICO Question 2

Are environmental or behavioral interventions effective at preventing MVC-related injuries among the elderly?

To answer this question, the committee found two subsets of data, one subset addressing reminder signs for seat belt use (2a) and the other subset addressing traffic-calming measures (2b).

Recommendation 2A

The guideline committee recommends that seat belt reminder signs are placed at exit points in areas with significant numbers of senior drivers, such as senior centers or assisted living facilities.

Elderly drivers are more likely to be injured by similar velocity crashes. Based on prospective interventional data collected in multicentered trials, seniors successfully responded to seat belt reminders, and the effects were sustained with time.

Recommendation 2B

The guideline committee suggests that pedestrian crosswalks be marked with stop signs or traffic lights and that traffic-calming measures be considered in areas of high pedestrian density.

The elderly are at high risk of injury as pedestrians struck by cars. However, it seems that unmarked crosswalks, that is, ones without stop signs or traffic lights, are associated with increased injury risk. Pedestrians may consider a crosswalk to be safe simply because it is a crosswalk, without considering driver cues or behaviors. In addition, lowering speeds and adding speed bumps or traffic circles in higher-trafficked areas was associated with fewer fatal pedestrian crashes. These should be considered but may also have important implications for businesses and residents.

PICO Question 3

Are risk screening strategies effective at preventing MVC-related injuries among the elderly?

Recommendation

The guideline committee suggests that elderly should be screened for alcohol abuse, frailty, significant diabetes, hearing impairments, severe visual impairments, and coronary artery disease (CAD) if they are continuing to drive because these conditions are known to increase the risk of MVC-related injuries.

Behavioral interventions to prevent MVC-related injury have been shown to be effective for elderly drivers. These types of programs aim to change elderly driver behaviors to enhance their safety and reduce injury. Seat belt awareness programs can be successful in changing the habits of a generation that did not have mandatory seat belt laws. However, the research on other behavioral interventions is lacking. There is a need for additional direct intervention investigations. Risk reduction strategies strive to identify key risk factors that place elderly drivers at higher risk for MVCs and injury. Several medical conditions such as arrhythmias, CAD, diabetes, and hearing impairment have been implicated. Universal screening for alcohol and drug abuse or use causing driving impairment, irrespective of age, should be a goal. Finally, frailty has been increasingly found to be associated with injury outcomes; frailty assessment may be a useful tool to help identify at-risk aging drivers, and its predictive ability should be prospectively studied.

It must be noted that the elderly driver population is heterogeneous; thus, any generalized limitation on driving privileges based on medical conditions is not indicated; individual patients should be screened for significant impairments that might affect their ability to drive safely.

Definitions

GRADE Definition of Strong and Weak Recommendation

	Strong Recommendation	**Weak/Conditional Recommendation**
For patients	Most patients would want the recommended course of action.	Most patients would want the recommended course of action, but many would not.
For clinicians	Most patients should receive the recommended course of action.	Different choices will exist for different patients, and clinicians should help patients decide.
For policy makers	Recommended course should be adopted as policy.	Considerable debate and stakeholder involvement needed to make policy.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Motor vehicle collision (MVC)-related injuries

Guideline Category

Prevention

Risk Assessment

Screening

Clinical Specialty

Family Practice

Geriatrics

Preventive Medicine

Intended Users

Advanced Practice Nurses

Health Care Providers

Nurses

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To assess the scientific evidence regarding motor vehicle collision (MVC)-related injury prevention strategies for elderly (age ≥65 years) drivers and pedestrians

Target Population

Individuals 65 years of age or greater

Interventions and Practices Considered

1. Consideration of passenger-specific factors such as age, weight, and height for ongoing advancements in car safety restraint systems
2. Environmental and behavioral interventions
   - Reminder signs for seat belt use

- Pedestrian crosswalks to be marked with stop signs or traffic lights
- Traffic-calming measures in areas of high pedestrian density

3. Risk screening (alcohol abuse, frailty, significant diabetes, hearing impairments, severe visual impairments, and coronary artery disease [CAD])

Major Outcomes Considered

- Rate of collisions resulting in injuries in the elderly
- Mortality rate
- Effectiveness of behavioral and environmental interventions
- Effectiveness of risk screening strategies

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Inclusion Criteria for This Review

Study Types

Studies included randomized controlled trials, prospective and retrospective observational studies, case-control studies, and meta-analyses. Case reports and reviews containing no original data or analyses were excluded.

Participant Types

The guideline committee included all studies of motor vehicle–related injury prevention for participants age 65 years or older.

Intervention Types

The guideline committee included all studies of motor vehicle–related injury prevention methods. Because of the heterogeneity of the interventions, they were grouped into the main themes of engineering advancements, environmental and behavioral modifications, as well as risk screening.

Outcome Measure Types

The guideline committee limited the review to studies in which injury was the outcome, not simply collisions or incidents. Because of the heterogeneity of injury reports, all injuries were felt to be critical to evaluating the literature within the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework.

Review Methods

Search Strategy

References were identified by research librarians using the Cochrane Library, and the MEDLINE database in the National Library of Medicine and the National Institutes of Health was searched using Entrez PubMed (www.pubmed.gov   ) in November 2012. The search was designed to identify all English language citations regarding motor vehicle–related injury prevention in the elderly. In addition to the electronic search, the guideline committee manually searched the bibliographies of recent reviews and articles. Finally, the committee performed focus search updates in November 2013 and November 2014, during the review and manuscript preparation stages. Figure 1 in the original guideline document contains the medical subject headings (MeSH) terms used for the initial search.

Study Selection

After completing a comprehensive literature search, three independent reviewers screened the titles and abstracts, excluding reviews, case reports, articles in which injury was not the outcome measure, and unrelated articles. The resulting studies were used for the review. The study selection process is highlighted in the PRISMA flow diagram for Figure 2 in the original guideline document.

Number of Source Documents

The reviewers found 14 articles regarding motor vehicle collision (MVC)-related injury prevention among the elderly addressing the three main areas of interest: car engineering, environmental and behavioral interventions, as well as risk screening strategies. Each evidence profile was evaluated separately as it related to the predetermined Population, Intervention, Comparator, and Outcome (PICO) question.

See the PRISMA flow diagram (Figure 2) in the original guideline document for an outline of the study selection process.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Methodology Levels for Rating the Quality of Evidence

Quality Level	Definitions
High	Very confident that the true effect lies close to estimate of effect.
Moderate	Moderate effect; true effect is likely close to estimate of effect but may be substantially different.
Low	Limited confidence; true effect may be substantially different from estimate of effect.
Very Low	Little confidence; true effect likely substantially different from estimate of effect.

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Data Extraction and Management

All studies used for the review were entered into a Microsoft Excel spreadsheet containing information on authors, article title, study methodology, as well as intervention and outcome measures. A master copy was provided to all reviewers.

Methodological Quality Assessment

The guideline committee used the validated Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology for this study. The GRADE methodology entails the creation of a predetermined Population, Intervention, Comparator and Outcome (PICO) question or set of PICO questions that the literature must answer. Each designated reviewer independently evaluated the data in aggregate with respect to the quality of the evidence to adequately answer each PICO question and quantified the strength of any recommendations. Reviewers are asked to determine effect size, risk of bias, inconsistency, indirectness, precision, and publication bias.

Methods Used to Formulate the Recommendations

Expert Consensus

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

The Population (P), Intervention (I), Comparator (C), and Outcome (O) or PICO questions were created using a modified Delphi method by the Eastern Association for the Surgery of Trauma (EAST) Injury Control and Violence Prevention Committee.

Population: age of 65 years or greater

Intervention: preventive strategies to reduce injuries from motor vehicle collisions (MVCs) or auto versus pedestrian incidents

Comparator: intervention compared with control group

Outcome: injury from MVCs or auto versus pedestrian incidents

1. PICO Question 1: Are car engineering advancements effective at preventing MVC-related injuries among the elderly?
2. PICO Question 2: Are environmental or behavioral interventions effective at preventing MVC-related injuries among the elderly?
3. PICO Question 3: Are risk screening strategies effective at preventing MVC-related injuries among the elderly?

Recommendations are based on the overall quality of the evidence. Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology suggests the phrases "strongly recommend" for strong evidence and "suggest" or "conditionally recommend" for weaker evidence (see the "Rating Scheme for the Strength of the Recommendations" field).

Rating Scheme for the Strength of the Recommendations

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Definition of Strong and Weak Recommendation

	Strong Recommendation	Weak/Conditional Recommendation
For patients	Most patients would want the recommended course of action.	Most patients would want the recommended course of action, but many would not.
For clinicians	Most patients should receive the recommended course of action.	Different choices will exist for different patients, and clinicians should help patients decide.
For policy makers	Recommended course should be adopted as policy.	Considerable debate and stakeholder involvement needed to make policy.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

Not stated

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

Please refer to the original guideline document for specific evidence.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- A 28.4% reduction in motor vehicle collision (MVC) mortality was seen after the adoption of a traffic safety code.
- In one study, the simple intervention of posting a seat belt use reminder sign at an intersection outside five senior communities increased the percentage of drivers wearing seat belts from 72% to 94%.

Potential Harms

Not stated

Qualifying Statements

Qualifying Statements

- The Eastern Association for the Surgery of Trauma (EAST) is a multi-disciplinary professional society committed to improving the care of injured patients. The Ad Hoc Section for Practice Management Guideline Development of EAST develops and disseminates evidence-based information to increase the scientific knowledge needed to enhance patient and clinical decision-making, improve health care quality, and promote efficiency in the organization of public and private systems of health care delivery. Unless specifically stated otherwise, the opinions expressed and statements made in this publication reflect the authors' personal observations and do not imply endorsement by nor official policy of EAST.
- "Clinical practice guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."* These guidelines are not fixed protocols that must be followed, but are intended for health care professionals and providers to consider. While they identify and describe generally recommended courses of intervention, they are not presented as a substitute for the advice of a physician or other knowledgeable health care professional or provider. Individual patients may require different treatments from those specified in a given guideline. Guidelines are not entirely inclusive or exclusive of all methods of reasonable care that can obtain/produce the same results. While guidelines can be written that take into account variations in clinical settings, resources, or common patient characteristics, they cannot address the unique needs of each patient nor the combination of resources available to a particular community or health care professional or provider. Deviations from clinical practice guidelines may be justified by individual circumstances. Thus, guidelines must be applied based on individual patient needs using professional judgment
- The paucity of controlled studies in the area of motor vehicle-related injury prevention among the elderly demonstrates a significant information gap, and this committee recommends further research to strengthen future evidence-based guidelines. Of note, the Population, Intervention, Comparator, and Outcome (PICO) questions for this guideline deliberately focused on prevention programs that had been tested; other strategies, such as graduated driving laws for seniors, have been posited but not rigorously examined. Future topical updates will require reevaluation of these and other potentially useful injury prevention strategies.

*Institute of Medicine. Clinical practice guidelines: directions for a new program. MJ Field and KN Lohr (eds) Washington, DC: National Academy Press. 1990: pg 39.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Safety

Identifying Information and Availability

Bibliographic Source(s)

Crandall M, Streams J, Duncan T, Mallat A, Greene W, Violano P, Christmas AB, Barraco R, Eastern Association for the Surgery of Trauma Injury Control and Violence Prevention Committee. Motor vehicle collision-related injuries in the elderly: An Eastern Association for the Surgery of Trauma evidence-based review of risk factors and prevention. J Trauma Acute Care Surg. 2015 Jul;79(1):152-8. [24 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2015 Jul

Guideline Developer(s)

Eastern Association for the Surgery of Trauma - Professional Association

Source(s) of Funding

Eastern Association for the Surgery of Trauma (EAST)

Guideline Committee

Eastern Association for the Surgery of Trauma Injury Control and Violence Prevention Committee

Composition of Group That Authored the Guideline

Authors: Marie Crandall, MD, MPH; Jill Streams, MD; Thomas Duncan, DO; Ali Mallat, MD; Wendy Greene, MD; Pina Violano, MSPH, RN-BC, CCRN, PhD; A. Britton Christmas, MD; Robert Barraco, MD

Financial Disclosures/Conflicts of Interest

The authors declare no conflicts of interest.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the Eastern Association for the Surgery of Trauma (EAST) Web site _____.

Availability of Companion Documents

The following is available:

- Kerwin AJ, Haut ER, Burns JB, Como JJ, Haider A, Stassen N, Dahm P, Eastern Association for the Surgery of Trauma Practice Management Guidelines Ad Hoc Committee. The Eastern Association of the Surgery of Trauma approach to practice management guideline development using Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology. J Trauma Acute Care Surg. 2012 Nov;73(5 Suppl 4):S283-7. Available from the Eastern Association for the Surgery of Trauma (EAST) Web site _____.

In addition, a continuing medical education (CME) activity for this guideline is available in the original guideline document _____.

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on November 17, 2015. The information was verified by the guideline developer on November 23, 2015.

Copyright Statement

This NGC summary is based on the original guideline, which is copyrighted by the Eastern Association for the Surgery of Trauma (EAST).

Disclaimer

NGC Disclaimer

The National Guideline Clearinghouseâ„¢ (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria.

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.